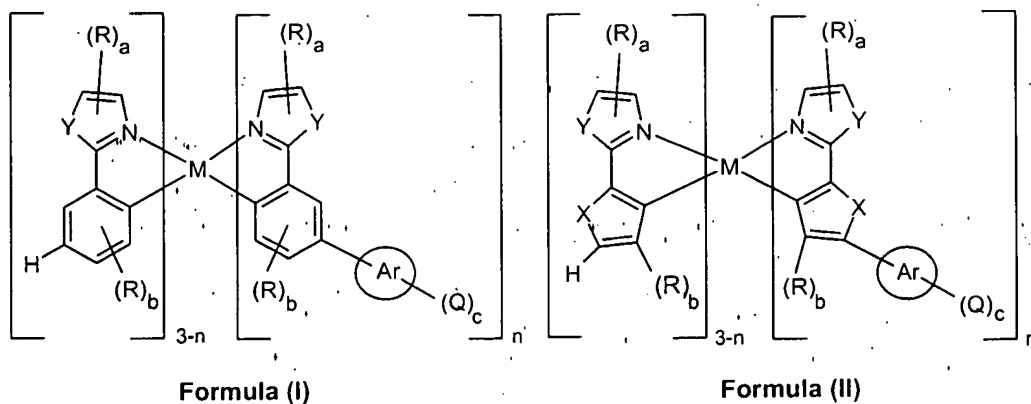


Claims:

1. A compound of the formula (I) or (II),

Scheme 1



where the symbols and indices have the following meanings:

- M is Rh, Ir;
- X is O, S, Se;
- Y is S, O, R-C=C-R, R-C=N;
- R is identical or different on each occurrence and is H, F, Cl, NO₂, CN, a straight-chain or branched or cyclic alkyl or alkoxy group which has from 1 to 20 carbon atoms and in which one or more nonadjacent CH₂ groups may be replaced by -O-, -S-, -NR¹- or -CONR²- and one or more H atoms may be replaced by F, or an aryl or heteroaryl group which has from 4 to 14 carbon atoms and may be substituted by one or more, nonaromatic radicals R; where a plurality of substituents R, either on the same ring or on the two different rings, may together form a further monocyclic or polycyclic ring system;
- Ar is an aryl or heteroaryl group having from 1 to 40 carbon atoms;
- Q is identical or different on each occurrence and is F, Cl, Br, I, CN, COOH, NH₂, OH, SH, NO₂, SO₃H, SiR₃ or a straight-chain or branched or cyclic alkyl or alkoxy group which has from 1 to 20 carbon atoms and in which one or more nonadjacent CH₂ groups may be replaced by -O-, -S-, -CO-, -COO-, -O-CO-, -NR¹-, -(NR²R³)⁺A⁻ or -CONR⁴- and one or more H atoms may be replaced by F, or an aryl or heteroaryl group which has from 4 to 14 carbon atoms and may be substituted by one or

more, nonaromatic radicals R;

A^- is a singly charged anion or its equivalent;

R^1, R^2, R^3, R^4 are identical or different and are each H or an aliphatic or aromatic hydrocarbon radical having from 1 to 20 carbon atoms;

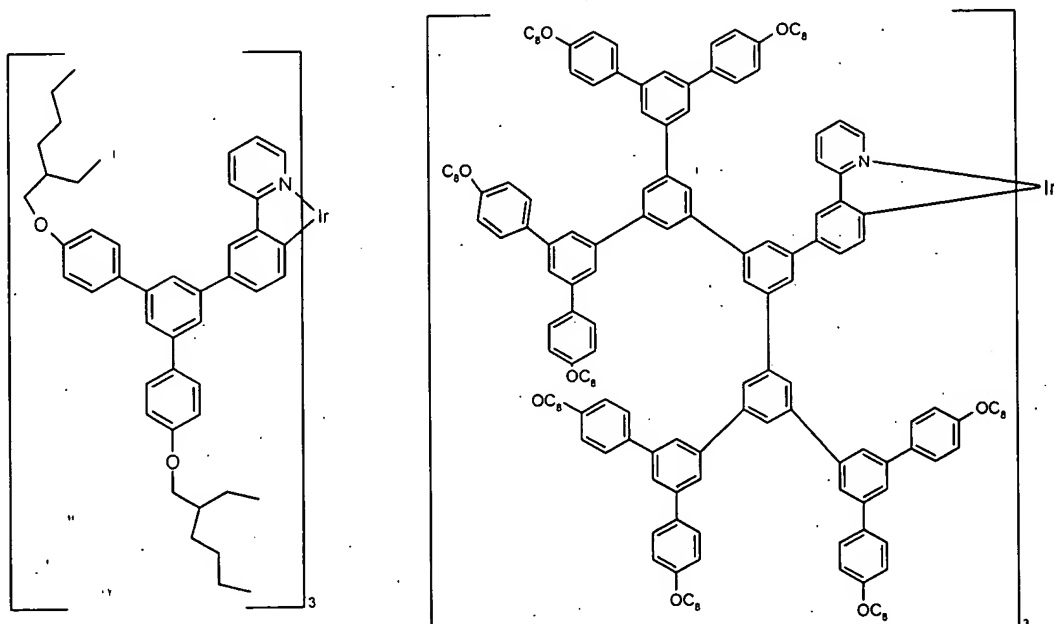
5 a is 0, 1, 2, 3 or 4, preferably 0, 1 or 2,

b is 0, 1, 2 or 3, preferably 0 or 1;

c is from 0 to 15, preferably 0, 1, 2, 3, 4 or 5, particularly preferably 0, 1 or 2;

n is 1, 2 or 3;

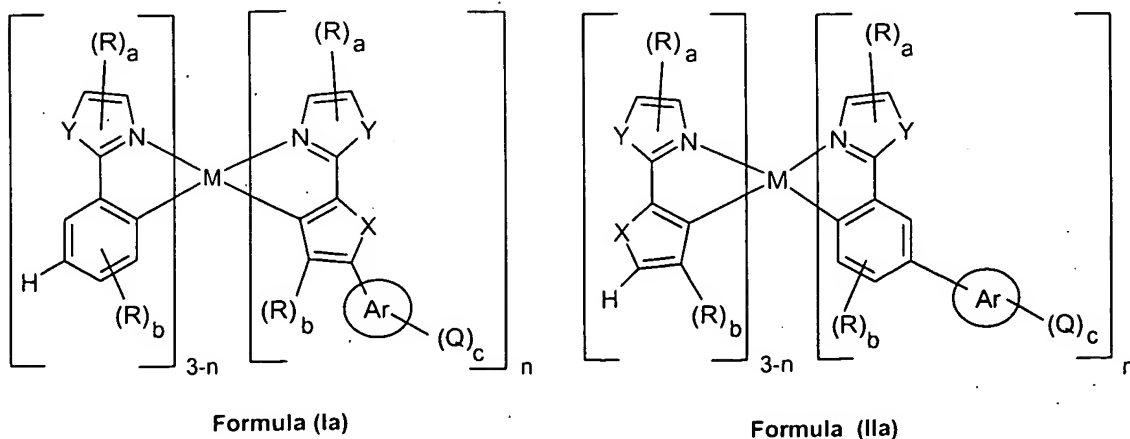
10 with the exception of the compounds:



where C_8 is 2-ethylhexyl.

2. A compound of the formula (Ia) or (IIa),

15



where the symbols and indices have the following meanings:

M is Rh, Ir;

X is O, S, Se;

Y is S, O, R-C=C-R, R-C=N;

R is identical or different on each occurrence and is H, F, Cl, NO₂, CN, a straight-chain or branched or cyclic alkyl or alkoxy group which has from 1 to 20 carbon atoms and in which one or more nonadjacent CH₂ groups may be replaced by -O-, -S-, -NR¹- or -CONR²- and one or more H atoms may be replaced by F, or an aryl or heteroaryl group which has from 4 to 14 carbon atoms and may be substituted by one or more, nonaromatic radicals R; where a plurality of substituents R, either on the same ring or on the two different rings, may together form a further monocyclic or polycyclic ring system;

Ar is an aryl or heteroaryl group having from 1 to 40 carbon atoms;

Q is identical or different on each occurrence and is F, Cl, Br, I, CN, COOH, NH₂, OH, SH, NO₂, SO₃H, SiR₃ or a straight-chain or branched or cyclic alkyl or alkoxy group which has from 1 to 20 carbon atoms and in which one or more nonadjacent CH₂ groups may be replaced by -O-, -S-, -CO-, -COO-, -O-CO-, -NR¹-, -(NR²R³)⁺A⁻ or -CONR⁴- and one or more H atoms may be replaced by F, or an aryl or heteroaryl group which has from 4 to 14 carbon atoms and may be substituted by one or more, nonaromatic radicals R;

A⁻ is a singly charged anion or its equivalent;

R¹, R², R³, R⁴ are identical or different and are each H or an aliphatic or aromatic hydrocarbon radical having from 1 to 20 carbon atoms;

a is 0, 1, 2, 3 or 4, preferably 0, 1 or 2,

b is 0, 1, 2 or 3, preferably 0 or 1;

c is from 0 to 15, preferably 0, 1, 2, 3, 4 or 5, particularly preferably 0, 1 or 2;

n is 1, 2 or 3.

3. The compound as claimed in claim 1 and/or 2 in which the symbol Y is O, S.

4. The compound as claimed in one or more of claims 1 to 3, characterized in that
 $Y = R-C=C-R$, $R-C=N-$.

5. The compound as claimed in one or more of claims 1 to 4, characterized in that
b = 0.

6. The compound as claimed in one or more of claims 1 to 5, characterized in that
Ar is an aryl group.

7. The compound as claimed in one or more of claims 1 to 5, characterized in that
Ar is a heteroaryl group.

8. The compound as claimed in claim 6 or 7, characterized in that the radical Ar is
benzene, toluene, xylene, fluorobenzene, difluorobenzene, diphenyl, 1,2- or 1,3- or
1,4-terphenylene, tetraphenylene, naphthalene, fluorene, phenanthrene,
anthracene, 1,3,5-triphenylbenzene, pyrene, perylene, chrysene, triptycene,
[2.2]paracyclophane, pyridine, pyridazine, 4,5-benzo-pyridazine, pyrimidine,
pyrazine, 1,3,5-triazine, pyrrole, indole, 1,2,5- or 1,3,4-oxadiazole, 2,2'- or 4,4'-
diazabiphenyl, quinoline, carbazole, 5,10H-dihydrophenazine, 10H-phenoxazine,
phenothiazine, xanthene, 9-acridine, furan, benzofuran, thiophene or
benzothiophene.

9. The compound as claimed in claim 6 or 7, characterized in that Ar is carbazole,
N-alkylcarbazole, N-alkylphenoxazines, phenothiazine and/or xanthene.

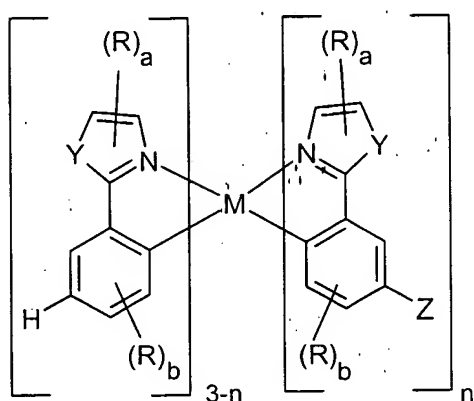
10. The compound as claimed in claim 6, characterized in that Ar is phenyl, 1- or
2-naphthyl, 1-, 2- or 9-anthracenyl.

11. The compound as claimed in one or more of claims 1 to 10, characterized in that
Q is F, Cl, Br, CN, NO₂, SiR₃ or a straight-chain or branched or cyclic alkyl or alkoxy
group which has from 1 to 6 carbon atoms and in which one or more adjacent CH₂
groups may be replaced by -CF₂-.

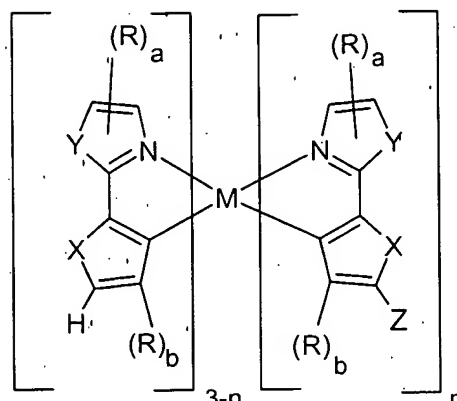
12. The compound as claimed in one or more of claims 1 to 11, characterized in that $M = Ir$.

13. The compound as claimed in one or more of claims 1 to 12, characterized in that c is greater than or equal to 1.

14. A process for preparing compounds as claimed in claim 1, by reacting compounds of the formula (III) or (IV),



Formula (III)

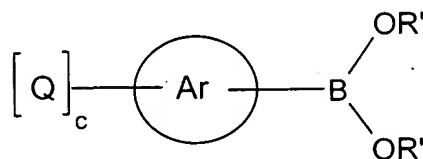


Formula (IV)

where the symbols and indices M , X , Y , R , a , b and n are as defined in claim 1, and

Z is Cl , Br or I ,

with an arylboronic acid or an arylboronic ester of the formula (V)



Formula (V)

where the symbols and indices Q , Ar and c are as defined in claim 1, and:

R' is identical or different on each occurrence and is H or an aliphatic or aromatic hydrocarbon radical having from 1 to 20 carbon atoms, where a plurality of substituents R' may form a monocyclic or polycyclic ring system,

5 in a reaction medium and in the presence of a transition metal or a transition metal compound, a phosphorus-containing or nitrogen-containing additive and a base.

15. The compound as claimed in claim 1 or 2, characterized in that its purity (determined by means of ¹H-NMR and/or HPLC) is more than 99%.

10 16. A mixture of one or more compounds of the formula (I/Ia) and/or the formula (II/IIa) as claimed in claim 1 or 2 with an unconjugated, partially conjugated or conjugated polymer.

15 17. The mixture as claimed in claim 16, characterized in that the polymer is selected from the group consisting of polyfluorenes, polyspirobifluorenes, poly-para-phenylenes, polycarbazoles, polyvinylcarbazoles, polythiophenes and copolymers comprising a plurality of the units mentioned here.

20 18. The mixture as claimed in claim 16 and/or 17, characterized in that the polymer is soluble in organic solvents.

19. The use of a compound as claimed in claim 1 and/or 2 in organic electroluminescence and/or phosphorescence devices.

25 20. The use of a compound as claimed in one or both of claims 1 and 2 or of a mixture as claimed in one or more of claims 16, 17 and 18 as emission layer (EML) in organic electroluminescence and/or phosphorescence devices.

30 21. The use of a compound as claimed in one or both of claims 1 and 2 or a mixture as claimed in one or more of claims 16, 17 and 18 in solar cells, in photovoltaic devices such as organic photodetectors or organic solar cells, in organic ICs

(organic integrated circuits), in organic field effect transistors (OTFTs), in organic thin film transistors and in organic solid-state lasers.

- 5 22. An electronic component comprising a compound as claimed in one or both of claims 1 and 2 or a mixture as claimed in one or more of claims 16, 17 and 18.